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AUTHOR	Warfield, John N.
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ABSTRACT

This volume serves as an overview document for a six-volume sourcebook collection describing the development of a regional environmental learning system. Included in this volume are: (1) organization of the sourcebook, (2) project description, (3) issues, (4) definitions of environmental education, (5) approaches and strategies for environmental education, (6) summaries of succeeding volumes, and (7) an appendix describing previous project reports. (RE)

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RESEARCH LABORATORIES FOR THE ENGINEERING SCIENCES

SCHOOL OF ENGINEERING AND APPLIED SCIENCE

UNIVERSITY OF VIRGINIA

Charlottesville, Virginia 22901

DEVELOPMENT OF AN INTERPRETIVE STRUCTURAL MODEL AND STRATEGIES FOR IMPLEMENTATION BASED ON A DESCRIPTIVE AND PRESCRIPTIVE ANALYSIS OF RESOURCES FOR ENVIRONMENTAL EDUCATION/STUDIES

A SOURCEBOOK FOR THE DESIGN OF A REGIONAL ENVIRONMENTAL LEARNING SYSTEM

VOLUME 1
OVERVIEW

Office of Environmental Education
Department of Health, Education and Welfare
Washington, D. C. 20202

Submitted by:

John N. Warfield

SE 030 969

Report No. UVA/522032/EE79/121

August 1979

RESEARCH LABORATORIES FOR THE ENGINEERING SCIENCES

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VOLUME 1
OVERVIEW

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Office of Environmental Education
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400 Maryland Avenue, S.W.
FOB #6, Room 2025
Washington, D. C. 20202

Submitted by:

John N. Warfield

Department of Electrical Engineering
RESEARCH LABORATORIES FOR THE ENGINEERING SCIENCES
SCHOOL OF ENGINEERING AND APPLIED SCIENCE
UNIVERSITY OF VIRGINIA
CHARLOTTESVILLE, VIRGINIA

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"Democracy is that form of social organization which most depends on personal character and moral autonomy. The members of a democratic society cannot be the wards of their betters; for there is no class of betters but only a better part gathered from all the members, and finding collective expression in what is called 'public opinion'. This, which in a democracy is the ultimate authority, is not, strictly speaking, opinion, but an interested attitude, a being for or against, a will, which is to be judged by moral standards as good will or ill will, and by cognitive standards as mediated by truth or error. The cultivation and firm implanting of enlightened good will in the body of its citizens is, then, the fundamental task of education for citizenship in a democracy."

--Ralph Barton Perry
REALMS OF VALUE: A CRITIQUE OF
HUMAN CIVILIZATION
Harvard University Press, 1954

A SOURCEBOOK FOR THE DESIGN
OF A
REGIONAL ENVIRONMENTAL LEARNING SYSTEM

VOLUME 1

OVERVIEW

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A SOURCEBOOK FOR THE DESIGN
OF A
REGIONAL ENVIRONMENTAL LEARNING SYSTEM

VOLUME 1: OVERVIEW

PREFACE

This is one of six Volumes of a report which, collectively, is intended to be a Sourcebook for the Design of a Regional Environmental Learning System. The report was prepared under Contract 300-700-4028 with the Office of Environmental Education.

This six-volume report presumes some background concerning the concept of a Regional Environmental Learning System, and with environmental education as a whole. Considerable relevant background was supplied in Volume 9 of the 4th Quarterly Report (A Descriptive Analysis of Environmental Education) and in the 5th Quarterly Report (Conceptual Basis for the Design of Regional Environmental Learning Systems), both of which are available from the Office of Environmental Education.

Volume 1 contains an Overview of the Sourcebook, with short summaries of the other Volumes.

A SOURCEBOOK FOR THE DESIGN
OF A
REGIONAL ENVIRONMENTAL LEARNING SYSTEM

VOLUME 1: OVERVIEW

EXECUTIVE SUMMARY

As part of a project sponsored by the Office of Environmental Education, a Sourcebook for the Design of a Regional Environmental Learning System has been prepared. The purpose of the Sourcebook is to provide a useful reference document for persons interested in improving and expanding environmental education.

Environmental education is connected to a number of issues. Some of these relate to education in general, some specifically to environmental education, some to the theory of individual learning and curriculum development, and some to the project that produced this report. Persons interested in environmental education may wish to consider the responses to these issues that have been developed during the project.

Five definitions of environmental education are presented, ranging from a capsule definition to an extensive process structural model. These definitions serve a variety of purposes, ranging from a presentation of a simple image of environmental education to a presentation of most of the ingredients one would expect in a mission and in a comprehensive program of environmental education.

A four-point approach to environmental education emphasizes parallel activities on several fronts, division of the mission among education sectors, regional scope in programming, and the adaptation of certain modern technologies that facilitate collective inquiry and learning. The Sourcebook is organized around this approach.

A nine-point strategy for carrying out the approach stresses participation, local initiative, collective inquiry methods, a

continuing network of people, high level of communications within the network, priorities that emphasize full use of available resources before seeking new resources, assistance from several kinds of sources, use of the Sourcebook as a continuing point of departure and reference, and evaluation as the network evolves and begins to be productive.

In the succeeding five Volumes methods for conceptual design and creation of a Regional Environmental Learning System are given. Methods of collective inquiry for learning are described along with results of some field tests of the methods. A background in evaluation approaches is given to help identify needs for evaluation, show how to design evaluation studies, and assess the data needed for evaluation. A discussion of content resource materials is given to help illuminate various learning materials and situations.

In the Appendix to this Volume, tables of contents of all the quarterly reports submitted on the project are given, to provide in one spot an overview of the project. This Appendix also provides a broad, but very concise overview of content resource materials developed under OEE grants.

CHAPTER 1

ORGANIZATION OF THE SOURCEBOOK

The purpose of this Chapter is to explain the organization of the Sourcebook for the Design of a Regional Environmental Learning System.

The Sourcebook consists of six Volumes. In this Chapter, there is an overview of each of the six. It is intended that this Chapter would be like a road map to the rest of this Volume 1 and to the other five Volumes. If you read this Chapter, hopefully you will be able to tell whether the Sourcebook contains discussions of interest to you, and where to find such discussions.

In addition to discussing the contents of the various Volumes, an explanation of the steps taken to try to make the Sourcebook "reader-efficient" is given. A reader-efficient Sourcebook offers a variety of devices to help the reader save time.

Beyond the usual device of providing Tables of Contents for the various Volumes, we present an "Executive Summary" at the beginning of each Volume. This Summary is intended to try to capture as much of the substance of the Volumes as can be done in a few pages. By reading each Volume in miniature, through the Executive Summaries, the reader can get a feel for the contents and thus make a decision as to whether the whole Volume is relevant to reader interests.

In addition to the relatively superficial insight gained from the Executive Summaries, we present in this Chapter location information--information about where various topics are treated. There is some overlap between the Summaries and the location information.

We believe that most of you who read this Chapter will not be starting from the same perceptions we have, nor will most of you share the same images of environmental education. This is thoroughly understandable, because of the scope of the subject. What this means to us, the writers of the Sourcebook, is that we have a special obligation to clarify our images and perceptions. Part of the Sourcebook is intended to do that. We believe that the rest of the Sourcebook will be much more meaningful if you see our assumptions and perceptions. The next four Chapters of this Volume 1 are intended, in part, to present those assumptions and perceptions.

In Chapter 2, you are invited to read a description of the project that produced this Sourcebook. You will see there what we did on the project, how we proceeded from one phase to another, what we were trying to accomplish, and how we went about it. Also in this Chapter we will mention some events that were not part of our project, but which had an influence on the way the project evolved and on the way the Sourcebook was conceived and presented.

In Chapter 3, you will see a discussion of a number of important issues that were raised during our project. Most of these issues were raised by more than one group or individual, and it would be impossible to reconstruct how or when they arose. But they have arisen repeatedly, so we assume they will be on our readers' minds. These issues will be raised again and again, whether in relation to the Sourcebook, or to education in general. While you may well have your own views on these issues, there will be some readers who are not familiar with all the issues, and who will probably want to give them consideration in the context of the Sourcebook. Rather than ignore these issues, we try to bring them into the open (knowing they will arise anyway), and we offer comments on them that relate to the way our project and the Sourcebook have evolved.

In Chapter 4, you will see five definitions of environmental education. The term "environmental education" is so broad, and is treated in so many contexts, that a variety of definitions seems essential. These five definitions are believed to be mutually consistent. However they have distinct utilities, and we will try to explain how each of them has its own merits. We will rely upon reader understanding of these definitions in some of the other Volumes, although further elaboration will appear in those Volumes.

In Chapter 5, we present approaches and strategies for carrying out environmental education. The fact that we include such a chapter says a great deal about our perspective on the field. We believe that environmental education is in a very early stage of development, and that a great deal has to happen before it can become a mature field. We are not alone in holding this view. Many who pioneered this field of education share this view. Yet those who are heavily engaged in environmental education will often be annoyed by this view, if only because the limited resources available for environmental education will not support all the activities that practitioners would like to carry out.

The approaches and strategies that are given in Chapter 5 will have to meet with the approval of a significant part of those who are interested in moving environmental education ahead, if this Sourcebook is to meet the expectations that we have for it. Thus we try hard to justify the approaches and strategies that we present. If you find these approaches and strategies convincing, we hope that the other Volumes of the Sourcebook will prove to be useful in helping you to move ahead with environmental education. If you do not find these approaches and strategies convincing, we hope that they will at least be sufficiently sharp to trigger in your own mind more effective replacements, and that they will stimulate you to make these known to others.

In Chapter 6, you will find descriptions of the contents of Volumes 2, 3, 4, 5, and 6. We introduce them here.

In Volume 2, there is described a process that can be initiated and carried out at local levels to develop what we call a Regional Environmental Learning System (RELS). The RELS offers a way to evolve a network of people who divide up the job of environmental education in such a way that the wide variety of objectives of environmental education can be achieved. If you become attached to the idea of a RELS, you may find that Volume 2 offers significant help in thinking through how you would take part in a RELS in your own situation. Certainly it isn't possible in Volume 2 to anticipate the interest of everyone in environmental education. But we believe that the idea of RELS, as developed in Volume 2, is broad enough to accommodate almost every legitimate interest in environmental education. On the other hand, RELS does presume that there are "people who need people," that an organized approach to environmental education (organized locally, taking into account local strengths) can be much more productive and satisfying than the present shaky arrangements.

Volume 3 continues the discussion begun in Volume 2. The distinctions between Volume 2 and 3 are not in terms of central theme, philosophy or aims. Volume 2 shows how you can conceptualize the RELS and Volume 3 shows ways to move ahead and create it, once you have conceptualized it.

Volume 4 responds to a very firm belief that most people have something to contribute to the understanding of environmental education, and that most people lack important information that others hold. Volume 4 treats methods of "collective inquiry." It discusses proven ways of sharing information in an educational mode. It tells how you can be a part of a learning situation that will probably be somewhat different from what you are accustomed to.

Volume 5 is intended to help you gain understanding of ways of evaluating environmental education. It is a down to earth approach that stresses a realistic view of local conditions. A variety of evaluation methods, tools, and sources of assistance is offered.

Volume 6 supplements the earlier reports on the various OEE-sponsored contracts and grants with other content-oriented discussions. Specifically, there is given a set of environmentally-oriented mathematics problems for eighth grade use, a typology for the science of human settlements, a methodology for constructing typologies, and a discussion of the Far West Laboratory work which has developed products suitable for use in teacher training in the energy area.

As mentioned, we shall discuss Volumes 2 through 6 in more detail in Chapter 6 of this Volume 1.

The Appendix to Volume 1 provides tables of contents of the principal reports that have been developed on the project from which this Sourcebook arises. We believe that this Appendix will be useful in revealing part of our background approach to developing the Sourcebook, and that it may also have collateral benefits as well, such as showing you the kinds of things that have been reported in the past from federal grants in environmental education.

Researchers may find the tables of contents useful in suggesting new issues or problems to be addressed in environmental education, or in locating various resource materials.

Of the various projects mentioned in the Appendix, those that have produced materials suitable for cataloging should be represented in the ERIC system. This system makes available microfiche or print copies of documents upon request, with a nominal payment involved.

CHAPTER 2

DESCRIPTION OF THE PROJECT THAT PRODUCED THE SOURCEBOOK

The Sourcebook for the Design of a Regional Environmental Learning System is one of several outcomes from a project that started in October of 1977.

The project was sponsored by the Office of Environmental Education (OEE). The OEE is a part of the Office of Education (OE) in the Department of Health, Education and Welfare (HEW).

The project was initiated by OEE through a contract awarded to the University of Virginia (UVA), Charlottesville, Virginia.

The UVA, in turn, awarded several subcontracts, and engaged the services of consultants and advisers.

The subcontractors to the project included the following organizations and principal investigators:

- Battelle Memorial Institute (Dr. Alexander Christakis)
- Far West Laboratories for Educational Research and Development (Dr. Bela Banathy)
- University of Dayton (Brother Raymond Fitz, S. M.)
- University of Illinois, CIRCE (Dr. Robert Stake)
- University of Northern Iowa (Dr. Robert Waller)
- Vanderbilt University (Dr. Robert W. House)

Persons serving as advisers and consultants included the following:

- Dr. Garry Brewer, Yale University
- Dr. Gordon Enk, Institute for Man and Science
- Dr. Allen Jedlicka, University of Northern Iowa
- Dr. William Loring, U. S. Public Health Service
- Mr. Thomas McCall, former Governor of Oregon
- Dr. Ralph Siu, consultant and author
- Dr. Russell Working, Toledo Board of Education

Inclusions of these names does not imply endorsement of the project results, nor responsibility for them. Rather it is to indicate that these persons contributed to our understanding of the challenge, suggested reference materials, displayed considerable interest in the work, and were willing to share their time with the project as an expression of their interest in environmental education.

The project can be said to have had three major aims, which were:

(a) To catalog, abstract, and analyze the results of approximately 700 grants awarded by the OEE during the period 1971-1977 inclusive.

(b) To develop a descriptive analysis of environmental education

(c) To develop a prescriptive analysis of environmental education

These aims can be roughly paraphrased as seeking answers to the following questions:

- What has been done in the OEE grants program, and how can the results be described for potential users of the materials and products developed?
- How can you describe environmental education?
- What needs to be done in environmental education?

The prior reports, outlined in the Appendix, dealt with the first two of these three questions. The Sourcebook is aimed at the third question.

THE OEE GRANTS PROGRAM

The analysis of OEE grants materials was carried out by UVA personnel. Over 700 projects were analyzed and abstracted. Of the materials and products produced, many were in a form that was suitable for entry into the ERIC system. These have been made available to The Ohio State University for classification and entry into ERIC. Persons interested in obtaining these materials may purchase them through the ERIC System.

DESCRIBING ENVIRONMENTAL EDUCATION

It was not easy to describe environmental education. Yet we believe that some progress has been made in this area. If we have made progress, it may be attributed in part to the criteria that we tried to pursue in arriving at descriptions. Before discussing how the descriptions were developed, let us look at the criteria that were applied in developing them.

You may understand that every investigator needs to be aware of, and to take steps to counteract, personal biases or idiosyncrasies. Thus one criterion that was applied in arriving at descriptions of environmental education was to achieve structural representation. By this, we mean that we sought views not just within our project, but went outside of it to various sectors in the society. We mention specifically the international sector, as represented through United Nations documents on environmental education, the federal sector, as represented through the Environmental Education Act of 1970 (and its legislative history and Amendments), the educational sector, as represented through a national survey of environmental education carried out in 1973-74, and the practitioners, as represented through recent grant activity and various publications and summary documents.

The way we used information reaching us from the various sectors was to analyze the content of the material looking for what we called "elements of environmental education." Here we sought both objectives and activities that should be a part of environmental education. A more detailed description of how these elements were used appears in previous project reports.

Also it was desirable, we believed, to apply a temporal criterion, i.e., to consider the evolutionary pattern of environmental education. This was in response to a general belief that environmental education was in a rather rapidly changing evolutionary pattern, exemplified partly by the ebb and flow within state departments of education, and by the changing nature of grant activities. It seemed reaonably clear that the mistake to be avoided in relation to the time pattern of environmental education was that of giving a description that would be obsolete by the time the Sourcebook was issued, or shortly thereafter. In other words, descriptions should be sought that had relative permanence. The effect of this would involve value judgments of what environmental education should be, but these judgments could come from the various sectors, at least in terms of the objectives and activities. The project staff would concentrate on how these elements could be sensibly organized and related to one another, as the various sectors had not undertaken such a task in any systematic way.

A further criterion to guide the descriptions would be to make the descriptions reasonably compatible with the present understanding of existing educational systems and processes. This is primarily a matter of using language that does not uselessly depart from that which is customarily meaningful in education. On the other hand, this criterion should not be allowed to prevent effective communication through excessive use of jargon, nor to prevent discussion of innovation where such appeared to be important.

Of considerable importance when funds are to be allocated is an understanding of the significance of legal definitions. In our system of government, monies tend to be allocated according to those standards of understanding that are established through the political process. Thus the definition of environmental education as established in federal law is necessarily a matter for considerable attention. On the other hand, the law puts a premium on brevity, and thus provides both some flexibility in interpretation, and an opportunity for consistent elaboration.

Finally, it was hoped to make the descriptions useful for ordinary discussing, planning, and action. But useful to whom? It was felt that the descriptions ought to be useful to anyone involved in or contemplating involvement in environmental education. This meant that some compromises had to be made in order to accomodate a wide audience. One could not cater to any one group. The effect is to impose a very modest burden (we hope) on every reader, in order to provide across-the-board usefulness of the descriptions.

The descriptions that were developed are summarized in Chapter 4 of this Volume. They were prepared cooperatively, for the most part, by project staff from UVA, Battelle, University of Dayton, University of Northern Iowa and Vanderbilt University.

PRESCRIPTIONS FOR ENVIRONMENTAL EDUCATION

As you will note, our "prescriptions" for environmental education are more suggestive than prescriptive. But we feel that this is appropriate because of the status of the field, and the social context in which it (and all of education) operates.

Certain basic concepts underlie our approach to forecasting a possible future for environmental education. One of these is the great need for a unifying concept that relates to operations. The concept used is the Regional Environmental Learning System or RELS. No concept is ever fully conceptualized in all its detail. We have tried to use the concept as a basis for developing exemplary processes and practices. We have tried to provide planning assistance for an uncertain marketplace. Not everyone believes in planning. Those that do often don't have time to pursue it.

We believe that a thorough understanding of the concept of a RELS, as we define it in later Volumes, can be very useful to you even if you reject the idea of a system or of a region. The words "environmental learning" are the most important ones in the RELS, and the other two help us present some of the concerns that are hard to deal with in the absence of the idea of "system" or of "region."

The RELS concept has primarily been developed by UVA, Battelle and the University of Dayton. Some of the possible approaches to learning within a RELS have been developed by the University of Northern Iowa and Vanderbilt University project staff. Assessment of the utility of some of the learning techniques has been carried out on this project with leadership from Vanderbilt. In addition, classroom evaluation has been done (on a different project) by staff of the University of Dayton in cooperation with teachers in Chaminade-Julienne High School in Dayton, Ohio.

We have received assistance in thinking about how environmental learning relates to various age groups and curricula from staff of the Far West Laboratory for Educational Research and Development.

In addition to the project activity, some of the staff of the project have benefited from attendance at the Boulder, Colorado, Consultation on Environmental Education in 1977 and the Leesburg, Virginia, Institute '78. At both of these meetings, grantees who were in various stages of grant activity were present. These grantees represented a wide variety of opinion about environmental education. We benefited from their comments, criticisms, activities and interests.

Finally, we have benefited greatly from a continuing interaction with key members of the staff of the Office of Environmental Education. The dedication of Walter Bogan (Director), Julia Lesceux, and Sylvia Wright exemplifies the best our civil service system has to offer. The unwavering intent of this Office to achieve the mission set forth in the Environmental Education Act has been an inspiration to this project.

Evaluation of Environmental Education

It was part of our project plan that the final report would include a discussion of evaluation methods. The University of Illinois Center for Instructional Research and Curriculum Evaluation (CIRCE) agreed to develop a part of the Sourcebook pertaining to evaluation. Their results provide both insight and methods for carrying out evaluation of environmental education. Their results appear in Volume 5.

CHAPTER 3

ISSUES AND RESPONSES

It is said that a certain federal official has a sign on his office wall that reads "credibility is a non-renewable resource." As we address a number of important issues relating to education in general or to environmental education in particular, we recognize three possibly negative reactions.

First, if we ignore these issues, it will be said that we are not knowledgeable of the issues and have done our work in an ivory tower divorced from the realism of the classroom, school district politics, state department staff limitations, school finance, or what have you.

Second, if we list and describe the issues but do not respond to them, it will be said that we may be aware of them, but have shirked our duty by not addressing them head on in our work.

Third, if we describe and respond to the issues, it will be said that we are defensive, and that we are simply using the issues to advance our own prescriptions.

In choosing among these three evils, the choice is clear. We take the third position, for it seems to us absolutely necessary to place you in the perspective that we have in relation to the RELS. Whether you agree with this perspective is another matter. But we do hope to induce you to understand it. And even if you do not relate these issues to the RELS as we do, you may well find it helpful to have these issues brought together in one place, even if not discussed in great depth. Even with this choice, we may still be subject to the first two critiques, for we may well not be encyclopedic in our recognition of issues. The ones we discuss are the ones that have been brought up frequently during the course of our project.

The issues have been sorted arbitrarily into these classes:

- General education issues
- Environmental education issues
- Theoretical issues
- Project-Specific issues

The order in which they will be addressed is to go from the more general issues to the more specific issues.

THE GENERAL EDUCATION ISSUES

The general education issues related to the "back to basics" movement, competition for time and space in the curriculum, bad communication due to excessive use of jargon, and the purposes and methods of evaluation in education.

It was said that there is now underway a movement in education to go back to basics. Among the consequences of this movement will be a retreat from attempts to integrate the disciplines, and a focus of administrative time and effort on improving the ability of students to learn the three R's. In addition to that, other areas such as consumer education, health education, and career education will be competing for time and space in an already overcrowded curriculum in the schools. Thus the chances of penetrating the curriculum with environmental education are not good or even timely.

There is no doubt that there is a movement under way to go back to basics. Also there is pressure from a variety of sources to modify school curricula.

The general thrust of these issues is to suggest a hopelessness in trying to bring environmental education into the schools. The basic argument is primarily one of "time economics". It says that there will not be time available in the schools to do the work needed to bring environmental education into the schools because of higher priority demands on time of people and time in the curriculum.

We believe that these arguments have some truth in them, but that there are reasonable counterarguments.

First of all, there is substantial diversity in our educational systems. Thus no matter what central thrusts occupy the system, they never demand more than a fraction of available effort and time. Second, a considerable amount of environmental education takes place in the non-formal sector of education. Third, by the time a mature image and set of materials adequate for environmental education has been achieved, conditions in the system may have changed substantially. Fourth, system priorities are undergoing continuous analysis in the light of the major changes that appear to be taking place in our society. As these priorities are analyzed, it may well be demonstrated that environmental education deserves an extremely high priority in secondary education, where the three R's begin to be gradually downplayed as major thrusts and begin to be seen as prerequisites to the learning of other subject matter. Fifth, there are ways to introduce environmental education along with the three R's (see Volume 6 for an example in mathematics education). Sixth, if there is any significant opposition to environmental education, we have not been able to detect it, thus if other conditions can be improved the feeling that environmental education is potentially very worth while may be converted into action.

It was said that environmental education, being interdisciplinary, and being involved in both the formal and non-formal system, is significantly hampered by the multiple jargons that characterize not only the several disciplines, but also professional educator talk. The language barriers not only have an impact on our capacity to develop suitable educational materials, but also inhibit the development of a closely knit community of formal and non-formal educators, preventing professional development in this field.

We believe that this issue is genuine and serious. However there are several reasonable counterarguments.

First of all we recognize that this issue is not peculiar to the province of environmental education, but that it arises any time anything is being considered that cuts across academic disciplines or across jurisdictional boundaries of institutions. Recognition of this fact does not, by itself, provide any easing of the difficulty. However one recognizes that the pervasiveness of this issue has caused it to be identified as one requiring attention. It has been receiving considerable attention during the past decade, and significant advances are being made at the theoretical and experimental level in dealing with it. These advances have not had widespread publicity. The general nature of the solutions involves a combination of novel methods for group collective inquiry, accompanied by skilled facilitation of group effort. These novel methods handle the jargon problem by editing prior to group discussion. Moreover they accomodate to the resolution of other issues to be discussed in this Chapter. Volume 4 of this Sourcebook addresses these matters.

It has been said that education is not meeting the demands for accountability in expenditures of public funds, and that evaluation is not adequate. The methods of evaluation are in a state of flux, and do not meet the expectations needed to gain continuing public support in several areas, of which environmental education may be one.

No response to this issue that avoids the question of how to demonstrate that environmental education is worth supporting can be satisfactory. There are certainly reasons why environmental education is harder to evaluate than most other educational areas. One is its relative newness. There has not been time to shake down this field and solidify its content, when compared to other areas of study that have been pursued for decades or centuries. Another is its transdisciplinary character. Because it goes across disciplines, and is sometimes issue-oriented, evaluation methods are hard to develop and implement.

Yet in these difficulties, there are some potential benefits. It seems clear that most environmental education efforts will continue to have "local uniqueness" for some time to come. This means that evaluation can be tailored, in part, to that uniqueness, and this will allow separate evaluations to be planned and carried out. And this also means that the evaluations can be relevant to local improvement, in contrast to some evaluations that are so broad or general as to leave a gap between the results of the evaluation and ways to bring about local improvement.

Also, it may be possible to get prominent and trusted citizens to carry out local assessments of the impact of environmental education. Suppose, for example, that community leaders at the local level assess the quality of environmental education by means that they themselves select. They might interview students, they might assess how well concerned groups in the community appear to be growing more knowledgeable and informed about regional issues, or they might work with teachers to develop tests that help them make these assessments. Then these citizens could furnish testimonials telling how they made the assessment and what they concluded. This might well serve for quite a few years as a reasonable and meaningful way to evaluate progress in environmental education.

Volume 5 of this Sourcebook deals with questions of evaluation.

ISSUES SPECIFIC TO ENVIRONMENTAL EDUCATION

Certain issues continue to be raised that are specific to environmental education. These include how environmental education should be defined, the relationship between "environmental politics" and environmental education, who should have jurisdiction over the conduct of environmental education (formal system or non-formal system or both), and the intent and administration of the Environmental Education Act of 1970 (as amended).

As we devote all of Chapter 4 to definitions of environmental education, we shall defer discussion of that issue.

It is said that there are some political obstacles in the way of environmental education. "Environmentalists" have an image of advocacy for environmental causes and exaggerate environmental dimensions of issues to the extent that they alienate persons who take a broader view of issues. Teachers have sometimes been fired for introducing sensitive local environmental issues into classrooms.

The view has also been expressed that the Environmental Education Act of 1970 did not represent a serious attempt to introduce knowledge synthesis into public education, as the Act stresses, but rather that it was an attempt to ease pressure on the Congress. The implication is that efforts to implement environmental education should not take seriously what the Act commends, but may simply go in whatever direction expediency or personal interest of grantees dictates.

The classroom of a public school is a place for exploration and learning, but not for advocacy of particular controversial causes. The complexity of most environmental issues makes such issues improper, unless they have been developed through careful case studies into a balanced and rational treatment. Thoughtless advocacy threatens the credibility of the whole educational process.

On the other hand, there must be a place for developing an informed public on controversial and highly political issues.

Our approach has been to say that environmental education must be addressed both in the formal system of education and in non-formal or community education. The former deals with the lasting values and themes that help to prepare a person for an individual life and career and to understand the past, present, and (to some extent) the future of the culture. The latter deals with the issues. No one can deal with issues comprehensively without hearing the positions of advocates. It is not advocacy that is bad, it is mindless deference to one part of the proverbial elephant.

To say that the Environmental Education Act should not be taken seriously is to demean our system of government. Critics of the Act have not documented any substantive reasons for doubting the wisdom of the Act. Usually what is said (implicitly, or between the lines) is that doing what the Act calls for is just too hard. We wouldn't argue with the idea that doing what the Act calls for is hard. But along with that difficulty there is an enormously exciting challenge, and if what the Act calls for is achieved, people involved in doing that can take a lot of pride and satisfaction in getting it done.

What is at stake in this area of discussion can be construed to be the whole philosophy of American government. The growth of Political Action Committees, the decline in percent of population voting in national elections, disillusionment with government, all are combining to convert this nation into a "committee of lobbies" using the "politics of selfishness". The alternative to a deepening of this situation is to do a much better job of educating informed citizens, able to cope with the complexities of the interactions among environmental components--to see the environment as a highly interactive complex of phenomena--and to make informed decisions on matters germane to long-term survival and quality of life. To say that this should not be taken seriously is to deny the importance of citizenship and the role of citizen in our society.

It is said that a major shortcoming in environmental education is the lack of content material suitable for reaching the level of achievement suggested by the EE Act. Whatever else may be done in environmental education, if suitable content material is not developed for use in classrooms, environmental education will always be severely limited.

The focus on content material is a focus on necessity rather than sufficiency. The EE Act itself uses the word "process" in discussing environmental education. What is needed in environmental education is an integrated combination of content and process, each being equally significant. Content without learning process and learning process without content are equally sterile.

The demands on environmental education are severe. Unless process and content can be wedded in an effective educational learning scheme, environmental education will be limited. This is why, in Volume 4, we place considerable stress on the process for developing and carrying out education in the content of environmental education.

In Volume 6 of the Sourcebook, we present and discuss various content resources, and introduce through the theme of human settlements a way of linking content and process.

It has been said that environmental education should be the province only of the formal education system. It has also been said that it should be the province only of the non-formal education system. Advocates for both positions are easy to find.

We have already mentioned in this Chapter the need for the formal system to introduce trans-disciplinary themes in formal education. These themes can be used as vehicles for learning complex patterns of relationships. In his book Mind and Nature, Gregory Bateson states the issue:

> "The pattern which connects. Why do schools teach almost nothing of the pattern which connects?"

Unless students learn how to learn such patterns, people who have completed school will continue to deal with complex issues superficially and intuitively, not knowing that there are superior ways to address the issues.

On the other hand, the politics of issues dictates that those highly complex and controversial issues be dealt with in a timely way. Surely this is the province of the non-formal education component.

We have elaborated on this argument in Volume 9 of our Fourth Quarterly Report.

THEORETICAL ISSUES

We have encountered theoretical issues pertaining to how one approaches the learning of complex material, what can be expected of individuals in terms of learning capacities at different stages of development, how the learning processes can be organized, and what is and is not appropriate in developing informed perceptions. While such matters have often been regarded as primarily in the province of educational research or psychology, they lie very close to the heart of the successful conduct of environmental education. They are very relevant to the issue of content raised earlier in this Chapter.

It is said that Piaget's research and related research by other investigators has demonstrated that children tend not to be able to deal with more than the most elementary relationships until they are eleven or twelve years old, and that after that they are still not able to deal with relationships involving more than four or five elements. It is also said that peer discussion helps people assimilate interrelationships. However others question these assertions.

As part of our project, we commissioned a research paper to tell us the state of the art of learning theory, to help us judge at what level people are likely to be ready to learn complex relationships involving environmental components. We concluded that it is probably not useful or cost-effective to try to deal with such relationships before children are at least 12 years old. After that, we believe, the capacity to work with such relationships is always inherently limited by natural properties of human beings unless they are aided by methodology or processes designed to overcome human limitations. This continues to be true we believe, although people will differ in their capacity to process information, depending on the amount of experience they have had, both inside the classroom and outside of it.

Experimentation in the classroom and in field tests has convinced us that the "collective inquiry methods" such as those discussed in Volume 4 are founded in good theory, and that they do provide effective learning processes suitable for environmental education. Needed to accompany the use of these methods are persons that can be described better as "facilitators" or "learning process managers" rather than as teachers.

The use of parallel hierarchies, one organizing the content of what is to be learned, the other organizing the process, has been advocated by educational researchers. It can be demonstrated that such hierarchies exist (implicitly) in many fields of knowledge for the content materials, and that teachers devise processes that follow the content hierarchies. However others disagree with these ideas.

The collective inquiry methods discussed in Volume 4 have been demonstrated to combine content and process, where the content is developed in a structure by the learners, and the process is organized to facilitate learner development of the knowledge hierarchy or other form of relationship. Successful field and classroom use of such methods appears to implement what educational theory has suggested is a practical, useful, and effective approach to learning complex subject matter. Participation and peer discussion is a vital part of these methods, which have been effective both inside and outside the classroom, for persons of high-school age or above.

PROJECT-SPECIFIC ISSUES

We discuss here those project-specific issues that relate to the products of the project. There are three that may be singled out. These refer to the emphasis on educational and organizational process for environmental education at the expense of content, the focus on a "learning system" as a primary concept in our Sourcebook, and the use of the term "region" as a part of this focus.

The argument that content must be developed for use in instruction or learning was discussed earlier as a general issue for environmental education. Also it was argued that this project should give more attention to content.

We have already discussed this issue in part in the section on issues specific to environmental education, and have discussed it again in the preceding section. We will only add to those discussions that while the project did not have a charge to develop content as part of the contract, and while other organizations are known to be working on content, we nevertheless proceeded with a modest effort. The results appear in Volume 6.

Also in Volume 6 we give an overview of a project that has produced a substantial and significant set of documents suitable for use in teacher training. The Far West Laboratory for Educational R&D reports are identified, and availability information is summarized.

The use of the term "region" in the name Regional Environmental Learning System (RELS) was questioned on several counts. First it was felt that the term had a negative connotation, in that it suggested federal control through various regional offices or commissions or other entities operating at regional levels, including perhas some that might be established in the future. Second it was felt that the region is not a natural administrative unit in regard to local or state control of education, and thus went counter to the structural reality of our education system.

These are significant arguments, and since they were not accepted, it is appropriate to explain why.

The primary reason for retaining the term "region" was to dignify the simple fact that environmental issues tend to set their own boundaries, which do not coincide with any political or educational jurisdictions.

A second reason for retaining the term is that we believe that successful environmental education programs will require networks of people sharing the social and professional workloads, thus providing an environment for mutual support and assistance. We believe that the flexibility required to establish such networks demands a non-rigid concept of the geographical scope of any organized attempt to carry out effective environmental education. This network should include persons from both the formal and non-formal education communities, and where persons are willing and capable, they should not be excluded by virtue of particular political or educational jurisdictions.

This will also explain a minor criticism that the term "region" was not well-defined by the project staff. The definition has been deliberately left undefined, because the issues and networks present opportunities and challenges to define regions according to local needs. Thus the term "region" should be seen as an invitation to local groups to recognize the validity of regional flexibility in developing a RELS.

It was argued that teachers, principals, superintendents, regional planners, and civic-minded citizens are not system designers. Thus the use of the word "system" and the challenge to design a system would both have negative connotations. Moreover the word itself suggested non-social, mindless entities programmed from a central source.

These objections rest, for their validity, on a typical elitist belief that one cannot have faith in people to perform if they have the knowledge, assistance, motivation, desire, and technical and financial assistance needed.

This image of people is not shared by the project staff. On the contrary, we believe that systems with regional scope can be designed at local levels, that initiatives can be taken, and that whatever assistance is needed can be identified, mustered, and put into action.

The whole thrust of this Sourcebook reflects that belief.

It is true that local people are not systems designers. But it is also true that they can be system designers. We present in Volume 2 a means whereby local people can carry out a conceptual system design for a RELS. Once the conceptual design is created, we believe that the principal organizational obstacle to carrying out environmental education will have been overcome. Participative methods are essential in the conceptual design, and allow for the development of local understanding and commitment, without which a RELS cannot be successful.

Even if we are wrong in our belief that local people will design their own RELS, this does not mean that our work is useless. The concepts, methods, and ideas given can be used, with modest changes, for the development of less ambitious pockets of environmental education activity. Evolution of a RELS-like arrangement may well come from such initial developments.

CHAPTER 4

DEFINITIONS OF ENVIRONMENTAL EDUCATION

In this Chapter, we present five ways of defining environmental education. Each of these definitions, we believe, has some particular merit. The definitions are identified as follows:

- The Capsule Definition
- The Definition from the Environmental Education Act of 1970 (as amended)
- A Graphic Portrayal of the Definition From the EE Act [The Linkage Model]
- The "Little Map" of Environmental Education
- The "Big Map" of Environmental Education

Since you are not familiar with these definitions, we postpone a discussion of how they relate to one another until we have treated each of them separately.

THE CAPSULE DEFINITION

The capsule definition is intended to fill the need for a one-line statement of what environmental education is. One line definitions of complex entities are never totally satisfactory, but there are times when it is essential to give an image that carries much of the meaning associated with a term. The capsule definition is expressed as follows:

$$A + B + C + D = EE$$

In this statement, A refers to the need for Awareness of the environment, B refers to the importance of a Balanced approach to its understanding (rather than a narrow, small-dimension approach or uninformed advocacy approach), C refers to Cognition or learning about the interactions among environmental entities, and D refers to the development of Decision-making capacity related to the maximum citizenship function, i.e., to making difficult decisions that affect our future on the planet and in the nation.

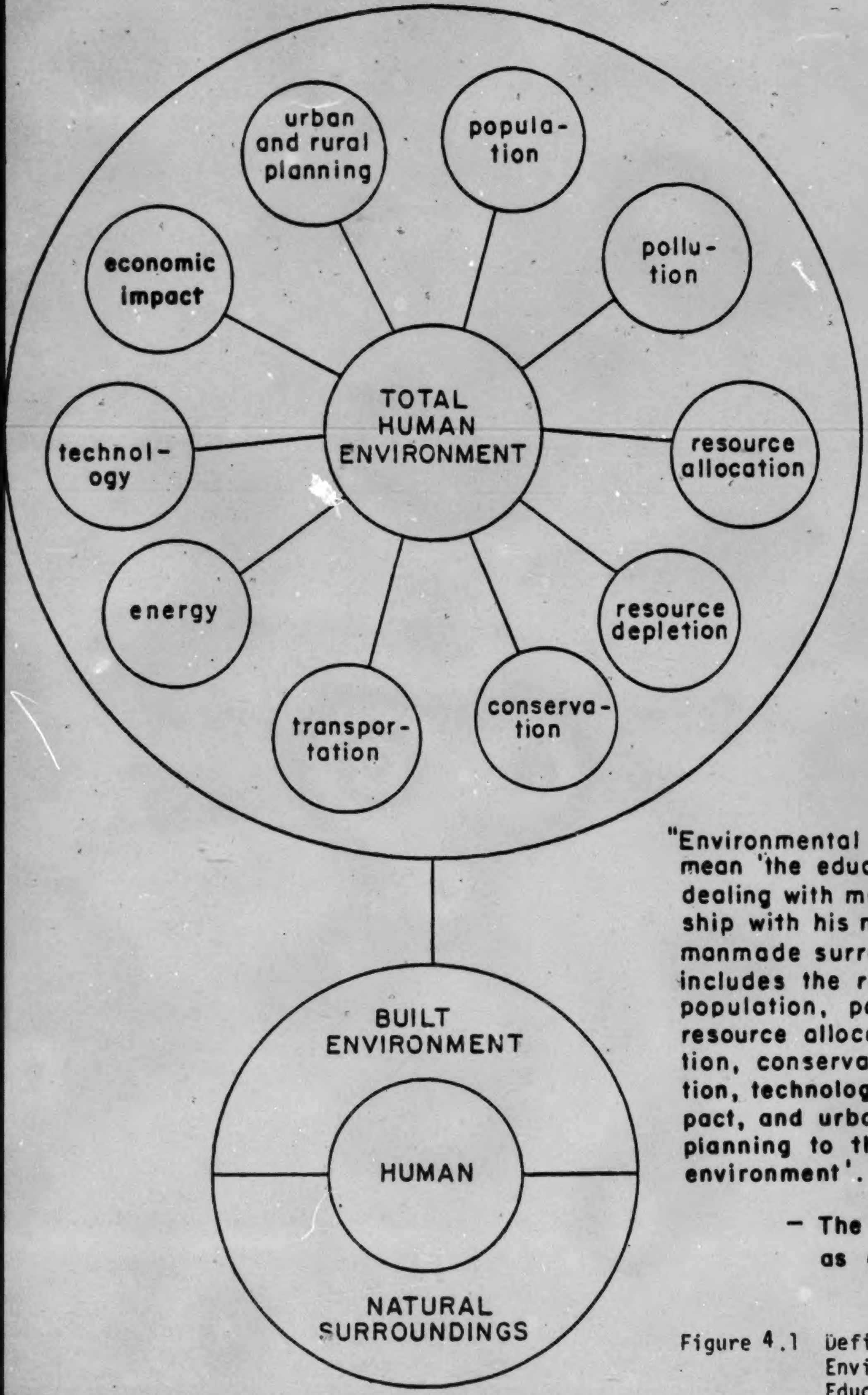
The symbols EE in the definition refer to Environmental Education. The equals sign means that if all four of the components are attained, one can say that environmental education has achieved success. Achievement of part of that, such as awareness without balance, cognition, or informed decision-making capacity, would be only partial success.

We have found the capsule definition to be useful in speaking to groups that do not have the time to delve more deeply into environmental education.

DEFINITION FROM THE EE ACT OF 1970 (AS AMENDED) AND GRAPHIC LINKAGE MODEL

We have found it useful to combine the definition of environmental education from the Environmental Education Act of 1970 (as amended) with a graphic portrayal of the definition. We call the graphic portrayal the "linkage model", and we consider that the prose statement in the Act and the linkage model each constitute alternative ways of giving a definition of environmental education. While they are essentially interchangeable, the one renders a prose image and the other a graphic image, and, depending on reader preference, one may be thought preferable to the other.

The combined two definitions are shown in Figure 4.1.


urban and rural planning
population
pollution
economic impact
TOTAL HUMAN ENVIRONMENT
resource allocation
technology
energy
resource depletion
transportation
conservation
BUILT ENVIRONMENT
HUMAN
NATURAL SURROUNDINGS

"Environmental education shall mean 'the educational process dealing with man's relationship with his natural and manmade surroundings, and includes the relation of population, pollution, energy, resource allocation and depletion, conservation, transportation, technology, economic impact, and urban and rural planning to the total human environment'."

— The EE Act of 1970, as amended.

Figure 4.1 Definitions of Environmental Education

THE "LITTLE MAP" OF ENVIRONMENTAL EDUCATION

The "Little Map" of environmental education represents an overview of a process image of environmental education. It contains seven "boxes". One of the seven boxes represents desired learning outcomes from environmental education, or the "intent" of environmental education. The other six boxes represent kinds of activities that make up the action component of environmental education.

The Little Map shows relationships that can be translated from a graphic portrayal into prose statements. Since methods of reading such maps are not well known, we present now a discussion of how to read a structure such as the Little Map shown in Figure 4.2. This same reading process can also be applied to read the Big Map, to be discussed later.

Unlike many graphics that use connecting lines without explanation, the Little Map uses connecting lines that have a specified meaning. We will explain this by talking about taking a walk on the Little Map.

If you imagine that the Little Map has been enlarged and is lying on a flat surface like a floor, then you can imagine standing on one of the boxes in the Little Map. You can walk on the Map, as long as you follow the directions of the arrows. You can think of any walk that starts from one box and ends at another box as generating a sentence. The sentence that you generate starts with what is in the box where your walk starts, and ends with what is in the box where your walk ends. In between one inserts the relationship represented by the walk, which is, "should help achieve".

For example, suppose that you start your walk in the box labeled "Learning Systems Design", and walk to the box labeled "Learning Activities". Then you have generated the sentence

"Learning Systems Design should help achieve Learning Activities".

Or if you start at the box labeled "Personnel Development" and walk to the box labeled "Learning Outcomes", then you generate the

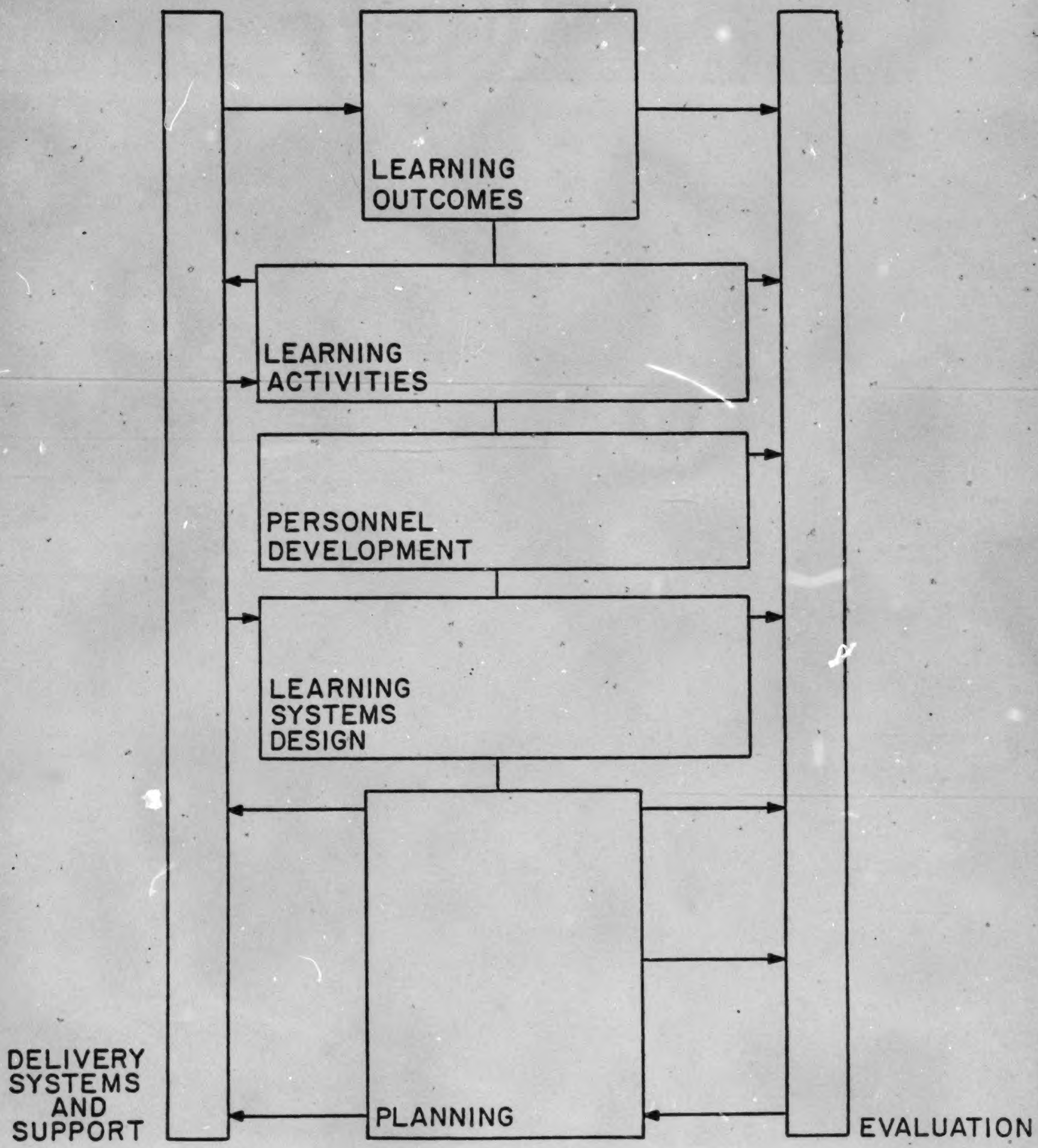

LEARNING
OUTCOMES
LEARNING
ACTIVITIES
PERSONNEL
DEVELOPMENT
LEARNING
SYSTEMS
DESIGN
PLANNING
DELIVERY
SYSTEMS
AND
SUPPORT
EVALUATION

Figure 4.2 A Little Map of Environmental Education
(The arrows represent "should help achieve".)

sentence

"Personnel Development should help achieve Learning Outcomes".

You can see that the Little Map is a way of showing on one page a reasonably large number of sentences, which reflect a presumed belief that certain activities, if carried out, should help achieve other activities, or like statements involving some combination of activities and learning outcomes.

Notice that, although there are only seven boxes shown in Figure 4.2, there are considerably more interrelationships shown there, each reflected in a walk that generates a particular sentence.

You can see that the Little Map is a kind of organizational model of environmental education. Nothing on the map specifically mentions the environment or environmental education. In this respect, the Little Map is probably also applicable to other kinds of education. However that does not disqualify it from being representative of environmental education.

The Little Map can be applied by administrators to consider how well the various kinds of activities needed to support learning outcomes are being carried out, and whether they are being appropriate used to truly help achieve other activities or learning outcomes. In this respect, it can serve as a coordinating tool.

It can also be used to help emphasize to individuals that are engaged in one box that what they are doing may be amplified in impact, if what they are doing is connected up to activities in other dependent or interdependent boxes.

In addition, the Little Map serves as a container for the Big Map. The Big Map amplifies substantially on the insides of the boxes on the Little Map, and shows in much more detail those activities and learning outcomes that are specifically germane to environmental education.

THE BIG MAP

The Big Map of environmental education represents an overview process model of environmental education, including a wide variety of activities that provide support, resources, or assistance to the learning activities.

If you have read the discussion of the Little Map, you will understand how to read the Big Map, since the principle of reading is the same, the walk on the map corresponding to the generation of a sentence asserting that a relationship holds between the boxes that represent the origin and termination of the walk.

The Big Map is a normative model of environmental education, in that it shows how environmental education should be functioning when it has attained that level of institutionalization that is characteristic of effective education, or how it ought to be attempting to function as it moves toward that level.

The functions served by the Big Map are intended to be the same as those served by the Little Map, except that the Big Map goes into greater depth than the Little Map.

Each of the seven boxes on the Little Map is detailed in the Big Map, thus it becomes possible to extract details from the Big Map by taking those parts that correspond to each of the seven boxes on the Little Map.

A full discussion of the Big Map appeared in the special report AN INTEGRATION OF NORMATIVE MODELS FOR ENVIRONMENTAL EDUCATION. This report was developed by the University of Dayton as part of the contract work that produced this Sourcebook. The University of Dayton also is responsible for Volume 3 of the Sourcebook. You will see additional discussion of the Big Map in that Volume.

CHAPTER 5

APPROACHES AND STRATEGIES FOR CARRYING OUT ENVIRONMENTAL EDUCATION

In this Chapter, we shall outline our general approach to environmental education, and also our approach to development and use of the six-volume Sourcebook. Before proceeding, let's review briefly what has been said so far in Volume 1, to set the stage for our further discussion.

In Chapter 1, we explained briefly the organization of the Sourcebook. In Chapter 2, we described briefly the project that produced the Sourcebook. In Chapter 3, we highlighted some issues that were raised during our project, and how we respond to those issues in our context. In Chapter 4, we presented five definitions of environmental education, and mentioned how these could be used. As we approach the presentations in this Chapter, we rely on reader background gained from these preceding Chapters, and we make direct use of the Little Map given in Chapter 4.

The Little Map shows six kinds of activities that help achieve the learning outcomes desired from environmental education. It also contains a box representing the learning outcomes desired, and this box is elaborated in detail in the Big Map. In this chapter, we shall focus on the six kinds of activities. They are: planning, learning systems design, personnel development, learning activities, evaluation, and delivery systems and support.

It is our perception that learning systems design is the area that, if adequately developed, would help the most in providing information useful to the other activities in the Little Map. It appears to be the area that is least understood, and which can provide useful frameworks and methods for supporting personnel development and learning activities. Also it connects very closely with delivery systems and support, which have to be given some attention in learning systems design.

As you continue with this Sourcebook, you will see that perception underlying most of what is done.

Now let us turn to the highlights of our plan for developing the Sourcebook. Figure 5.1 illustrates in a very general way what we hope to do.

You will notice that we begin by defining environmental education and by defining a mission for Environmental Education. These two aims are so closely coupled that we show them in a single box in Figure 5.1.

We have given the definitions in Chapter 4, and we now indicate that we believe the mission can be perceived by analysis of the details of that part of the Big Map that relates to Learning Outcomes. We shall discuss the mission in detail in Volume 2 of this Sourcebook, where it can be related directly to system design.

Item 2 in Figure 5.1 relates to conceiving an approach for carrying out environmental education. We have a four-point approach, which we will present and justify later in this Chapter, to accomplish Item 3 in Figure 5.1

Item 4 in Figure 5.1 involves showing how the approach can be organized. We will discuss the organization of the approach later in this Chapter.

Item 5 and 6 refer to conceiving and justifying a strategy for carrying out the approach. We have an 8-point strategy, which will be discussed later in this Chapter.

Item 7 refers to the presentation of detailed methods for carrying out the approach. All of the remaining Volumes of the Sourcebook are intended to reflect the accomplishment of Item 7.

While Figure 5.1 reflects the general plan for developing the Sourcebook, you will recognize that it hits only the broad outlines of what we seek to accomplish. Nevertheless, it represents a point of reference in assessing whether we have developed the Sourcebook along constructive lines.

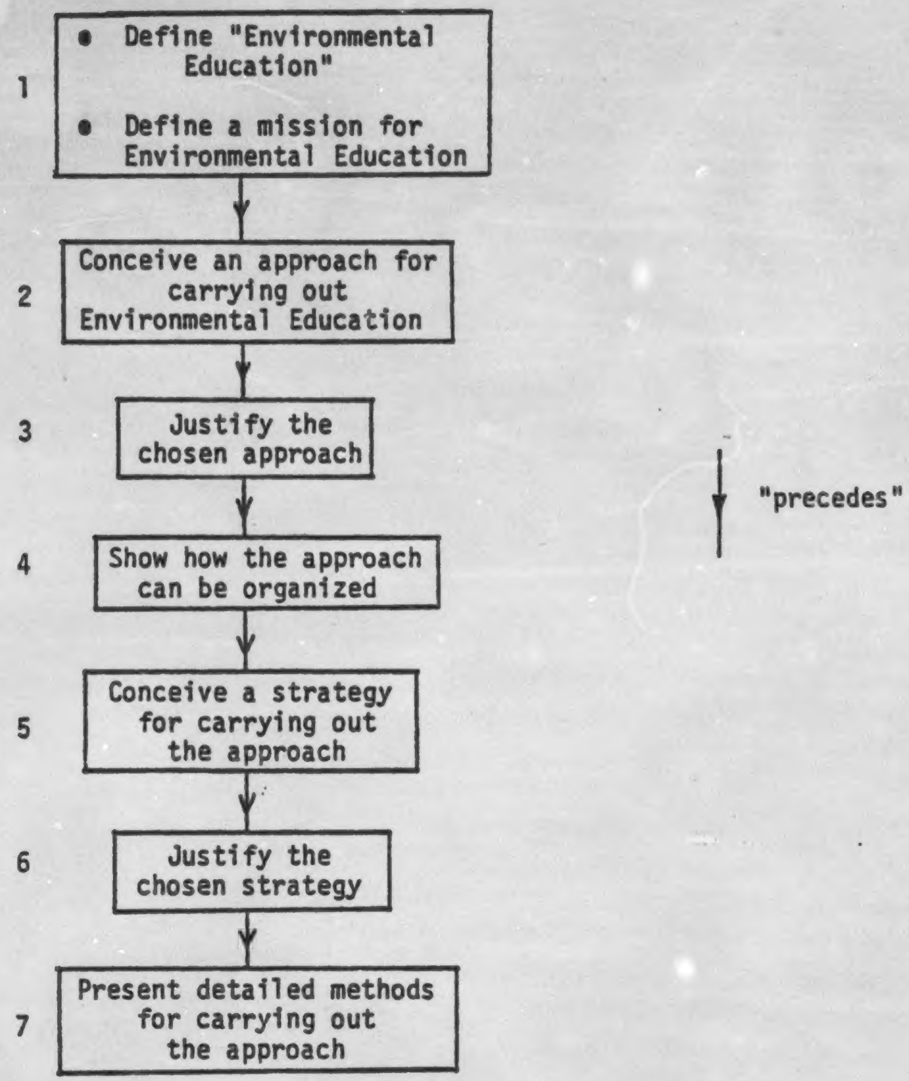

1
Define "Environmental Education"
Define a mission for Environmental Education
2
Conceive an approach for carrying out Environmental Education
3
Justify the chosen approach
4
Show how the approach can be organized
5
Conceive a strategy for carrying out the approach
6
Justify the chosen strategy
7
Present detailed methods for carrying out the approach
"precedes"

Figure 5.1 Sequenced Plan for Developing This Sourcebook

APPROACH TO CARRYING OUT ENVIRONMENTAL EDUCATION

Our approach to carrying out environmental education is a four-point approach. This is an approach that we recommend to persons who may be interested in developing a RELS or, to those who might be otherwise involved in environmental education. For each of the four points, we first state the point, and then we give a justification.

Point 1. Work in parallel on all six of the activity components of the Little Map, taking advantage of specialized activity in each of these six action areas. Coordinate these parallel efforts to help assure that the benefits of interaction are achieved.

People with many different specialties and information are needed to carry out the mission of environmental education. We can compare EE to a modern, mass transit, express train. Each of the six action areas is like one car, and the specialists are riding in different cars. If all the cars are connected together, moving in the same direction, with the same speed, powered by a suitable engine, one engine can help the whole train get to the destination. If the cars are moving in different directions at different speeds without any coordination, confusion and failure is the likely result.

Point 2. Divide the Mission of environmental education among the formal and non-formal sectors of the education community. Provide strong liaison between the sectors.

The mission is too diverse and complex to be dealt with by either the formal or non-formal sectors alone. The two sectors differ in aims, focus, and style. The personnel in the sectors differ in interests, aims, and skills. By dividing the mission the overall task is made easier, the work can be better matched with aims, focus, and style, and each sector can benefit from awareness of what is happening in the other sector.

Point 3. Develop Environmental Education with emphasis on a regional scope. Local, national, and international perspectives should be included, but the regional scope should receive the greatest emphasis.

The mission is too complex to be dealt with effectively by a handful of people. A regional scope can involve enough personnel to do a respectable job. The expenses can be spread across a larger area. The span of interaction can be large enough to match the scope of regional issues. Interpersonal support possibilities are enhanced by a regional scope. To go substantially beyond regional scope would create a coordination problem so large that the approach would break down.

Point 4. Adapt modern technologies for working with complexity to help facilitate the unusual learning challenges associated with the mission of environmental education.

The mission of environmental education, and especially the learning activities, are too complex for conventional learning methods to be effective. Several modern technologies have been shown to be both acceptable and effective to facilitate learning about environmental matters. Their use is technically feasible. With regional scope, their use should be economically feasible. Time sharing and cost sharing of computer equipment and support personnel will allow use of these learning technologies.

Next we proceed to consider how this approach can be organized and developed in the Sourcebook.

ORGANIZING THE APPROACH

Our organization of the approach involves the conception of a central unifying theme around which the approach can be detailed. The central theme is the Regional Environmental Learning System (RELS). The Sourcebook is developed around that theme.

The Sourcebook shows what is to be achieved (the mission of environmental education, Volume 2), what can be done to achieve it (the Approach just discussed), how it can be accomplished (the Strategy, to be discussed next), and the operational details (presented in succeeding Volumes of the Sourcebook).

The kinds of parallel activities needed are illustrated in the Little Map and the Big Map. The mission can be divided with the use of Options Fields and Options Profiles, as will be shown in Volume 2. Development of a RELS with regional scope is described in Volume 3. The use of modern technologies is described in Volume 4. Methods of evaluating what is done are discussed in Volume 5. Representative case materials are given in Volume 6.

STRATEGY FOR CARRYING OUT ENVIRONMENTAL EDUCATION

Our strategy for carrying out environmental education involves nine points. We present and justify each of these nine points.

Point 1. The development of a RELS is a local initiative.

Research shows that projects in education work best when they are initiated at that level in the system where the motivation resides and where the work is to be carried out, both being essential. A successful RELs will require frequent interaction and cooperation from the people involved in implementing it. This can't be achieved by remote control. A RELS in one region will differ from a RELS in another region, especially in the non-formal or issue-related component, but also in the formal component because of variations in school district sizes, staffs, and management capacities. Also authority will vary from one region to another. There will also be variation in ethnic backgrounds, interests, needs, and in what is especially relevant.

Point 2. The development of a RELS is highly participative, but managed by competent facilitators, locally selected.

The definitions of environmental education show it to be highly interdisciplinary and transdisciplinary. Participation is essential to involve suitable scope of subject matter. To get a regional focus, there will be a need to involve regional planners, representatives of various government and educational jurisdictions, teachers, and citizens at large. Many administrative challenges have to be addressed that involve school and community leadership.

There is abundant evidence that groups cannot be very productive in working out fairly complex arrangements, unless skilled facilitators are available who know how to help groups get results.

Point 3. The development and operation of a RELS proceeds with the benefit of collective inquiry methods.

Collective inquiry is inherent in participation and also in learning how to conceptualize patterns of interrelationship, such as occur profusely in environmental education. Research and field tests show that collective inquiry can be greatly facilitated when modern methods of collective inquiry are applied with the help of a skilled facilitator. These methods assure that people can participate and that their ideas receive consideration. The methods help to organize, display, and document the results of collective inquiry, so that people's time is honored and their efforts do not pass away. This helps to assure and sustain the necessary participation.

These methods are useful in designing the RELS, developing the RELS, and in doing classroom instruction or non-formal issue exploration.

Point 4. A RELS survives because of a continuing network of capable and dedicated people.

The work of environmental education is too hard and too complex to be done successfully unless there is a network of people working together, sharing common objectives, sharing their individual knowledge, and providing each other with personal assistance, support, and recognition.

Point 5. A high level of communication is facilitated within a RELS to assure good administration and cooperation (with adequate telephone and copying facilities).

You cannot sustain a cooperative effort that depends on interaction, if people cannot communicate with each other in a timely way.

Point 6. Priorities in RELS development have to recognize the present financial difficulties of the schools and the society at large. Ingenuity is needed to marshal talents and services that are already available without new sources of funds. Demonstration of effective use of readily available resources will demonstrate as well the mean-business attitude that is likely to convince sponsors that additional funds or resources should be forthcoming.

It is unreasonable to expect that a RELS will represent a system that is added to the existing system of education. It is better thought of as a concept around which people can organize in order to meet important challenges that are presently not adequately met. It is consistent with this thought that the RELS will open up alternative career directions for educators, and will add new dimensions to activities of regional and local planning agencies. It is also consistent with this thought that the amount of interaction going on between formal and non-formal education can expand significantly. Thus the RELS is seen as a catalytic concept, whereby current practice evolves into a new mode of operation for some practitioners, administrators, and students.

Participation in the design of a RELS affords an opportunity for persons who expect to be a part of the evolution to begin on the ground floor. Right from the beginning, priorities should recognize that available talent and resources should be identified, sought out, and used to the maximum extent.

Since few regions will possess all of the needed talent and resources, external funds will be needed. Ability to acquire such funds is normally enhanced if it is shown that full advantage is being taken of readily available resources, and that additional funds can provide substantial encouragement and the capacity to move ahead with a plan that is both economically and academically sound.

Point 7. Assistance will be sought from all levels of government, from education professionals, from systems professionals, from professional facilitators, and from others as needed.

It is a certainty that to achieve a RELS comparable in functionality to what is needed to satisfy the EE mission, assistance will be needed. Every type of assistance that is needed is available, but it must be sought and cultivated. The amount of assistance and the kinds of assistance will vary from one region to another.

Point 8. The Sourcebook for the Design of a Regional Environmental Learning System will be used as a continuing baseline reference in developing and operating a RELS.

If too many cooks spoil a broth, it may be because they do not talk to each other and do not start from a common recipe. It is not necessarily departures from a recipe that cause a joint culinary failure. It may be because everybody is working from a different recipe, and the various cooks don't recognize it.

If everyone shares the Sourcebook, everyone has something in common from which to approach a RELS. Departures from the prescriptions in the Sourcebook, when shared, allow the Sourcebook to continue to serve local needs. Departures from the prescriptions, when made individually and arbitrarily, destroy the continuity and shared perceptions, mess up communications and expectations, and provide an avenue to the destruction of the RELS.

One way to implement Point 8 is to begin to design a RELS with the expectation that, as the design proceeds, the Sourcebook will be replaced with a new one developed locally. If this approach is taken, then the new one will gradually replace this Sourcebook. In that event, this Point would lose its significance. But if resources do not permit such a development, Point 8 should remain in force. Even then, amendments could be written to modify the Sourcebook or to add to it, for continuing local baseline reference. This would minimize the impact of personnel turnover upon the likelihood of success of the RELS.

Point 9. Evaluate as you go.

Continuing evaluation will serve at least three critical purposes. First it will inform those persons who are part of the RELS about what is happening and thereby enable them to assess their own performance. Second it will sustain morale among the persons who are part of the RELS (assuming that useful results are being achieved). Finally, it will reassure those persons who are involved in providing financial support that the funds are being put to good use, and thereby help assure continuing support as needed.

DETAILED METHODS FOR CARRYING OUT THE APPROACH

You will recall that we use Figure 5.1 to show the sequenced plan for developing this Sourcebook. Seven steps in the plan were illustrated there. We have now dealt with all of the steps except two. We have not discussed, in detail, the mission of environmental education, nor have we discussed the detailed methods for carrying out the approach.

We have discussed definitions of environmental education in Chapter 4, and in this chapter we have conceived, presented, and justified an approach to carrying out environmental education. We have shown in this chapter how the approach can be organized. We have conceived, presented, and justified a strategy for carrying out the approach.

It remains now to express the mission of environmental education in more detail, and to present detailed methods for carrying out the approach.

The mission of environmental education is dealt with in Volume 2, where also there is given a procedure that can be used to conceptualize a RELS design.

Further elaboration on the succeeding Volumes is given in the next Chapter, where we describe how the succeeding Volumes present detailed methods for carrying out the approach.

CHAPTER 6

SUMMARIES OF THE SUCCEEDING VOLUMES

SUMMARY OF VOLUME 2

Environmental education can be perceived as contributing to three great purposes of education, with emphasis upon qualifying the learner to contribute to the civilization of the future. Against this perspective, the special mission of environmental education can be stated in capsule form: "environmental education should equip the learner with a knowledge of how to analyze interactions among the major components of the total human environment, to the end that the learner becomes able to contribute to the civilization of the future through informed decision-making relevant to that environment."

An elaborated mission statement presents in a one-page graphic a set of outcomes desired from environmental education, and a way of interpreting how those outcomes are interrelated.

The mission statements provide a basis for proceeding toward a design of a Regional Environmental Learning System (RELS). The design begins with the generation of options from which design selections will later be made. Next the options are sorted into categories. These are examined to determine whether they are necessary in system design. If they are deemed necessary, they are designated as systems dimensions, otherwise they are discarded.

A one-page drawing is prepared showing the options, grouped into system dimensions, and a tie line to be used in formalizing and portraying design decisions. This drawing is called an options field. The ten dimensions of the options field are shown and the options under these dimensions are discussed.

The process of choosing options is broken up into three steps to make the work of the design group easier. A skilled facilitator is needed to help the group work through these steps. In the first step the interdependence of dimensions is structured. In the second step the group decides in what sequence the dimensions will be addressed in choosing design options, using the information stemming from the first step. At the conclusion of these two steps, the design group has a good understanding of the options, their interrelations, and the priority with which the dimensions will be addressed in choosing options. The third and last of the three steps involves selecting options in each of the dimensions according to the priority sequence developed in the second step.

As choices are made in the third step, the selected options are tied to the "tie line" by means of lines, to show what has been selected at any given point in the design process, and to show the total design concept at the conclusion of the process. The collection of lines showing the design choices makes up the options profile for the system design.

Individuals and organizations who represent part of the total system effort can also construct options profiles for their subsystem, and a visual overlay of transparencies of options profiles can be used to show the composite of the subsystem profiles, which combine to form the system profile.

The design methods are related to various kinds of projects identified in the Environmental Education Act. The specific types mentioned in the Act include research projects, demonstration projects, pilot projects, and evaluation projects.

A RELS may be a comprehensive project in that it involves a substantial scope within the region, and also in that it may or may not include parts of the four project types mentioned. On the other hand a RELS may be a comprehensive pilot project, or it may be a comprehensive demonstration project, depending upon local situations and project aims.

A RELS may embrace all of the kinds of activities mentioned in the Environmental Education Act, but it need not conduct all such kinds. Rather it must provide focus and direction.

Evaluation that cannot address the content of environmental education is not meeting the ultimate goals of environmental education. Thus other types of evaluation should stress benefits that justify support.

SUMMARY OF VOLUME 3

Regional Environmental Learning Systems are in a very early stage of development. The concept of a RELS is one of progressive evolution from initial awareness of the environment to collective inquiry about environmental themes or issues, culminating in better resolution of issues and better decision-making.

Several examples of activities that illustrate how people can work together at a local or regional level to begin to focus on regional environmental issues or concerns are given. These help to develop images of ways in which a RELS can begin to develop and operate. Several characteristics of RELS are given. They define regions to match problems with resources, allow collective inquiry and action, constitute networks of social transformation, develop their members, and develop in an organic evolutionary manner.

A "still picture" of a RELS focuses upon the processes of collective inquiry and the context variables in the local situation. A "moving picture" of a RELS focuses upon the evolution in time, with emphasis on three phases: mobilizing interest, creating the initial RELS experiment, and institutionalizing the RELS.

A road map for resolving environmental issues is set forth to provide a sourcebook for groups interested in working with those issues. The road map discusses dialogue, decisions for resolving an issue, action to resolve the issue, and evaluation of the issue resolution cycle.

The three phases of RELS evolution are discussed in detail, with suggestions for how to develop the RELS in these phases.

SUMMARY OF VOLUME 4

Collective inquiry refers to an organized process for sharing ideas on an issue, and for resolving the issue; or, alternatively, for carrying out a system design collectively.

The steps, approaches, and tools of collective inquiry are outlined in this volume. Emphasis is on a few selected tools and approaches that have proved to be useful in practice.

Included in the approaches are the charette, the A. T. and T./Battelle approach, and the Washington State approach.

Included in the tools are brainwriting (ideawriting), nominal group technique, worth assessment, voting procedures, and interpretive structural modeling (ISM).

Also included in the discussion are the results of field tests on brainwriting, nominal group technique, and ISM, carried out with staff of the Tennessee Valley Authority.

In addition, a field test is reported wherein the methodology for RELS conceptual design (described in Volume 2) was tested with a target group assembled from the Tennessee Valley Authority region. The latter group consisted of environmental educators from several institutions in the region.

The field tests of the tools resulted in generally favorable evaluations.

The field test of the conceptual design approach included a request that the participants respond with both the pros and the cons of the approach. Most of the favorable comments related to the comprehensiveness of the approach, and to the way in which it facilitated the work of the group. Most of the unfavorable comments related to the difficulty of carrying out the work on a short time schedule. The reader is referred to the Volume 4 for a more comprehensive discussion of all of the field tests.

It is believed that the results of the field tests support our belief that conceptual design can be done locally for a RELS, and that the methods of collective inquiry are useful and effective for groups. However these methods do rely on the availability of a skilled facilitator to help with process issues.

A discussion is given of how equipment can be used to help conduct collective inquiry, and to facilitate it. A description is given of computer software that has been found useful in the classroom and in community planning, primarily to help groups organize the large amounts of information that tend to be used in environmental education.

SUMMARY OF VOLUME 5

The purpose of Volume 5 is to provide local persons with a source book to help them think through how to go about getting evaluation done at a local project level. A literary approach is taken initially, to try to place the reader in a local setting, and to give a feeling for the importance of local specifics in assessing environmental project activity.

Gradually the reader is taken through some local case experiences into a hypothetical consideration of how evaluation of a local experience might be initiated at the local level, and with due concern for the local situation.

Five kinds of local evaluation opportunities are illustrated. These include evaluation of a local board of directors of a project, evaluation of the impact of an inservice training project, evaluation of possible bias in committee work, evaluation of student achievement, and ethnographic evaluation of a community-based program.

Methods of organizing an evaluation study are given. These include the basic ideas of evaluation of educational programs, a classification of evaluation approaches, ways to get organized, how to develop a plan of action, substantive questions, and records and reports.

Methods of organizing a RELS evaluation unit are discussed, including evaluation responsibilities, the structure needed, what $5,000 will buy in the way of evaluation, and ways to get assistance. Various resource persons and centers are identified, and technical assistance in evaluation is discussed. A bibliography is given of evaluation topics and relevant articles and books.

SUMMARY OF VOLUME 6

In the first part of Volume 6, there is presented a set of mathematics problems suitable for introducing environmental education in the 8th grade. This set of problems emphasizes numerical calculations relating to energy and similar environmental topics. The set has been designed to mesh nicely with most of the current mathematics curricula.

The second part deals with a typology for human settlements, based on the ekistics grid developed by Doxiadis. Here the typology is reviewed for adequacy as a basis for organizing environmental education around the core theme of human settlements.

In one appendix, there is given a theoretical basis for organizing knowledge which appears to be useful in organizing the various core themes of environmental education.

In a second appendix, there is a short description of a set of teacher training materials focusing on energy and land use which were developed by the Far West Laboratory for Educational Research and Development. Availability information for these materials is included.

A third appendix provides summaries of work done under OEE grants.

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by Raymond Fitz, Joanne Troha, and Lorna Wallick

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Audio-Visual Materials

1971

OEE Number	Product	Title	Author	Abstracted by Hereford
4578 (A)	2 radio shows on audio tape cassettes	Environment--San Diego	Dept. of Education San Diego County California	no
4585 (A)	slides and cassettes to accompany annual report	Soil Survey--An Inventory of the Land	Conservation Education Council Winnebago County Rockford, Illinois	no
4609 (E)	slides (12)	slides of *Clearwater* sloop and sloop restoration	Pratt Institute New York City	no
4610 (A)	videotape cassette	First Films	WNET Educational Broadcasting Corporation New York City	yes
4628	16 mm. color and sound film	Don't Hold Your Breath	G.A.S.P. (Group Against Smog and Pollution Pittsburgh, PA	yes
4631	slides	Buried Sunshine	E. Tennessee Development District Knoxville, TN	no
4639 (A)	16 mm. color film	If We Care Enough	Southern Methodist University, Dallas, TX	yes

Audio-Visual Materials

1972

OEE Number	Product	Title	Author	Abstracted by Hereford
4995	color slide set 3 audio cassettes	Ecological Concepts	Univ. of Wisconsin Green Bay, WI	yes
		Energy		yes
		Solid Waste Management		yes
5028 (A)	film with color and sound	Project Earth--Airports	WNET, Educational Broadcasting Corp., New York City	yes
5050 (D)	slides, cassettes	Environmental Awareness Through the Arts	Louisiana Council for Music & Performing Arts New Orleans, LA	no
5054	2 filmstrips	So You're Going to Visit Our Museum and	American Museum of Natural History New York City	no
		A Discovery Walk in Natural Science		no
5062	30 color slides	Inner City Environmental Survey	Roosevelt University Chicago, Illinois	no
5119 (A)	film	Old Towns and Urban Environment	Miami-Dade Community College, Miami, FL	yes
5135	filmstrip cassette	A Concrete Ecology--Inner City	National Wildlife Fed. Washington, D. C.	no
5139 (A)	cassette slides	Information About Indians	United Tribes of North Dakota Development Corp. Bismarck, N. Dakota	yes
5143 (C)	2 audio tape reels	Rural India--May You Have 100 Sons	Indiana University Bloomington, IN	no
5435 (A)	slides (169)	The Last Goliath	Vincennes & Knox County Public Libraries, Vincennes, Indiana	no
(B)	16 mm. film	The Last Goliath		yes

Audio-Visual Materials

1973

OEE Number	Product	Title	Author	Abstracted by Hereford
5459	audio cassettes (to accompany final report)	Personnel Development--Environmental Education Project	Central Washington State College Ellensburg, WA	no
7103	(D) 20 slides	Lake Brazos Studies	Texas System of Natural Labs, Inc. Austin, TX	
	(E) color film with sound (super 8)	Environmental Education--A New Approach		no
	(F) video cassette	A Walk Along the Bosque		no
	(G) 16 terrain photos	Photographs of Lake Brazos Banks		

Audio-Visual Materials

1974

OEE Number	Product	Title	Author	Abstracted by Hereford
7316 (A)	video cassette	Televised Environmental Field Trips	Northeast Pennsylvania Educational TV Assn., Pittston, PA	no
(B)	video cassette			
7339	filmstrips (5) cassettes (5)	It's All Yours	Girl Scouts of America New York City	no
7350	slide series and film "Maineland"	Presumpscot River Educational Program	University of Maine Portland, Maine	no
7371	filmstrip and cassette (2 sets)	Testing for Dissolved Oxygen Testing for Fecal Coliform	Institute of Environmental Education Cleveland, Ohio	no
7389	filmstrip	H_2O Pollution by Pesticides	Consortium "C" Educational Service Centers, Houston, TX	yes
	filmstrip	Population Explosion		yes
	filmstrip	Environmental Awareness Through Module Development		no
	cassettes for filmstrips above			no
	super 8 film	Environmental Education--Auto-Tutorial Approach		no
7391	(see next page for separate listing)		St. Scholastica Inst.	
7392	video cassette (color)	Magic Birthday Party	Natl. Council for Geographic Education, Oak Park, IL	yes
7400 101-109	film/booklet (series of 9)	Energy Series	University of Colorado Boulder, Colorado	yes
110	filmstrips (8) audio cassettes (8)	?a preview set of the 9 energy films?		no
7405	slide sets, audio cassette	The Prairie, A Resource for Environmental Study	Bethel College North Newton, Kansas	yes
7417 (A)	tape reel	Western White Water Rivers	University of Oregon Outdoor Program Eugene, Oregon	no
(B)	slides in carousel			no
(C)	slides in carousel			no

-2- Audio-Visual Materials 1974
OEE No. 7391 - Personnel and Resource Development
and Secondary Education in the Lake Superior Region
College of St. Scholastica
Duluth, Minnesota

UVA Catalog Number	Product	Title	Author	Abstracted by Hereford
211	slides and cassettes (2)	Module 2 Hydro Systems		no
302 (A)	slides and tapes	Human Geography of Lake Superior		no
(C)	slides and tapes	" " " " "		no
305	slides	Evocation Slides Module 2--Hydrosystems		no
404	transparencies	Transportation & Distributive Economy of Lake Superior Region		no
407	cassette with slides, 2 tapes	Concept Presentation Dealing with Hydrosystems		no
408	slides	Concept Presentation Module 2--Hydrosystems		no
507	transparencies (20)	Human Geography		yes
512	tape and slides	Transportation and Distributive Economics		no
600	slides, cassettes	Influx 6		no
601	slides, cassettes	Hydrolix		no
603	transparencies	Hydrosystem of Lake Superior Basin		no
605	transparencies	Geosystems of Lake Superior Region--Module 1		no
1301	miscellaneous slides, cassettes, tapes, filmstrips	Geosystems Concept Presentation (may have duplicates)		no

Audio-Visual Materials

1975

OEE Number	Product	Title	Author	Abstracted by Hereford
714	(B) transparencies	Project SEED	Seymour Environmental Education Development Seymour, CT	no
	(C) videotape	Town of Seymour, CT		no
	(D) videotape & maps	Project SEED Appendix G		no
	(E) slide carousel	Project SEED		yes
715	slides	Earth Metabolic Design	Yale Station, CT	no
717	(E) 3 tapes	Energy and Environment:	Educational Development Center, Cambridge, MA	
	(E-1) audio cassette tape	Deep & Surface Mining: Appalachians Speak		yes
	(E-2) audio cassette tape	Songs of Appalachia		yes
	(F) filmstrip and narration	Surface Mining: Assessing its Environmental Impact		yes
720	color videotape	Blueprint for Action	WGBY, Springfield, MA	yes
728	videotape reel	Low Net Energy Environmental Farm for Community/ Secondary Education	Supt. Public Instruction Olympia, Washington	no
731	slides and audio cassette	Land Use Planning, for City, for Citizen	Louisville, Kentucky, Lung Association	no
732	slides and audio cassette tape	Lee County Land Use Plan	Mississippi State Univ. Mississippi State, MS	yes
908	16 mm. film (15 minutes)	Currents of Change: The Eel River	Humboldt County Schools Eureka, CA	yes
1078	audio cassettes (5) slides	Environmental Problems Associated with Energy Resource Development in North Dakota	North Dakota State University, Fargo, North Dakota	no
1632	filmstrips (11) audio cassettes (3)	Environmental Education Material Resources for 5th Grade Science	New York City Board of Education	no

Audio-Visual Materials

1976

OEE Number	Product	Title	Author	Abstracted by Hereford
1977 (A)	cassette & slide carousel	Soil and Water Resources: A Vital Part of Land Use Management, Part I	Middlesex County Conservation Dept., Connecticut	yes
(B)	slide carousel	Soil and Water Resources (Part II)		no
1989 (B)	color videotape	Time On Our Hands	Hardin County Board of Education Kentucky	yes
(C)	color videotape	Energy Alternatives		yes
(D)	color videotape	Your Emotions and Your Environment		yes
(E)	color videotape	Autos: Scourge or Salvation		yes
(F)	color videotape	Water--Restrict It?		yes
2013	color videotape (1 hour, approx.)	A Community Called Earth	Northwest Regional Foundation Spokane, Washington	yes
2016	13-minute cassette	Who Owns the Water?	CENCOAD for Citizens Involvement Network Washington, D. C.	no
2024 (A-F)	6 color videotapes (1 hour each)	Energy--It's Your Decision (6 parts)	WGVC-TV Allendale, Michigan	yes
2025	reel-to-reel video tapes	Education Through Environmental Health	Seth Video Workshop & Mt. Sinai School of Medicine, New York City	yes
(D)		Noise Pollution		
(E/F)		Plastics		
(H)		Lead Poisoning		
(K)		Asbestos		
(N)		Pollution		

-2- Audio-Visual Materials 1976

OEE Number	Product	Title	Author	Abstracted by Hereford
2033	video cassette	A Special Place	Southwest Educational Development Laboratory, Austin, Texas	no
2035	color video cassettes	Land Use in New Hampshire	New Hampshire Network University of N. H. Durham, N. Hampshire	
(A)		Where We Are		no
(B)		An Act of the People		no
(C)		Voices of the Land		yes
2042(A)	slides and audio cassette tape	Seminar on Open Space	Center for Urban Studies, Southern Methodist University Dallas, TX	yes
2050	16 mm. color film video cassette of film	Great Electric Power Puzzle	WJCT, University of Northern Florida Jacksonville, FL	yes
2053	color video cassette	The Farmlands	St. Lawrence County, New York, Environmental Management Council Potsdam, N. Y.	yes
2060 (A)	16 mm. color film (40 minutes)	Beat the Hawk	Social Development Commission, Milwaukee, WI	yes

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by R. W. House
A. P. Sage

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